

Comments on Seldovia Village Tribe, Indian General Assistance Program 2011-2012, Cook Inlet Tribes Subsistence Consumption Assessment Preliminary Draft, Lon Kissinger EPA Region 10, 2/20/13

Summary of comments:

Thank you for the opportunity to review this report. It clearly was a major effort for all involved and takes a step towards developing fish consumption rates of importance to environmental regulation and potentially nutritional health assessment.

It is very important that report be redrafted to include percentiles of fish consumption rates. Both Superfund (Comprehensive Environmental Response Compensation and Liability Act - CERCLA) and Resource Conservation and Recovery Act (RCRA) risk assessment procedures generally use upper percentile fish consumption rates (e.g. 90th or 95th percentiles). Upper percentile consumption rates might also be used for development of ambient water quality criteria. Consumption rates should be developed separately for salmon, marine, and resident fish. Though difficult to ascertain, shellfish consumption should be quantitatively characterized. Shellfish consumption is likely significant and different amounts and types of contaminants are found in shellfish relative to finfish. Consideration should be given to integrating shellfish consumption with fin fish consumption. The ambient water quality criteria currently use consumption of freshwater and estuarine fish AND shellfish as the basis for setting standards. Failure to include shellfish consumption will bias consumption rates low and will result in inappropriately lax water quality standards. CERCLA and RCRA risk assessments generally utilize consumption of seafood that could acquire site related contaminants in developing risk estimates. Fish consumption rates that do not include shellfish will result in risk estimates that are biased low and inappropriately lax risk based cleanup levels.

Some consideration should be given to characterizing consumption for groups of species with similar feeding behaviors. Species with similar feeding behaviors may have similar types of contaminants and body burdens of those contaminants. Assessment of risks is sometimes based on analytical data for a representative species within each group and the consumption rate for that group.

It would be very useful to have another statistician(s) review this report. In particular, the impact of treating fish consumption rates as being log normally distributed should be considered. References to statistics texts supporting the methods used should be incorporated.

It would be very useful to include a copy of the questionnaire as an appendix to this report.

Page 6, 5.2.1 Inaccurate estimates of per capita fish consumption in the United States: Would be useful to have maps showing locations of villages.

Page 7, 5.2.1 Inaccurate estimates of per capita fish consumption in the United States: Citation of average consumption rates for the Suquamish (Suquamish 2000), Squaxin Island, and Tulalip Tribes (Toy et al. 1996) would likely be more relevant, as these tribes have access to marine resources.

Suquamish Tribe. 2000. Fish Consumption Survey of the Suquamish Indian Tribe of the Port Madison Indian Reservation

Toy K, N Polissar, S Liao, GDA Mittelstaedt. 1996. Fish Consumption Survey of the Tulalip and Squaxin Island Tribes of the Puget Sound Region, Puget Sound Region

Page 7, 5.2.2 Degraded water quality: In addition to discussion of the proximity of the villages to sources of contamination, there might be some discussion of harvest areas relative to source of contamination. I think this is the primary concern.

Page 9, sample size calculation: Don't understand "percentage picking a choice." Can this be explained differently?

Page 9, sample size calculation: A statistics text book explaining the origin of the population size equation should be provided. Additionally, the equation appears to be based on assumption of a normal distribution. It might have been better to assume a log normal distribution, as seafood consumption rates are frequently log normally distributed. Computation of sample size assuming a log normal distribution is given in Toy et al. 1996 (full citation provided in previous comment).

Page 10, sample size calculation: Why wasn't a recommended sample size computed for each village rather than assuming a value of 36?

Page 10, sample size calculation: Again, with a log normal distribution, it is unlikely that 95% of observations fall within two arithmetic standard deviations of the mean.

Page 11, estimation of the standard deviation: Better sources of information for deriving standard deviation would have been data from the Suquamish (Suquamish 2000), Squaxin Island, and Tulalip Tribes (Toy et al. 1996).

Page 12, 6.1.4 Weighting data: Please provide a reference discussing the weighting approach. Is N_h the number of households per village?

Page 13, 6.3.1 24-Hour Recall: Even though 24 hour recall results are more accurate than food frequency questionnaires it is helpful to develop a list of commonly consumed items to assist in recall. Was this done? How were portion sizes ascertained? Were models used?

Page 15, 6.3.2.1 Seasonal Consumption: Do villagers consume any fish stews or similar preparations? Were these quantified?

Page 15, 6.3.2.1 Seasonal Consumption: Several other fish consumption surveys in the Pacific NW broke out consumption according to the feeding behavior of the fish concerned (e.g. migratory, water column, bottom feeding). Since contaminants may accumulate in organisms as function of feeding behavior, it is useful to have consumption information for these groups. Source of fish was identified on this group basis. How was source of fish treated for this survey? On an individual species basis? At a group level? For all species?

Page 16, 6.3.3.2 Consumption throughout the year: Increasingly repeated 24 hour recall approaches and modeling are being used to get at usual long term dietary intake. Future surveys may wish to consider this approach.

Page 16, 6.3.3.2 Consumption throughout the year: It might have been useful to gain an idea of seasonality and to characterize in season and out of season consumption.

Page 17, 6.3.3.2 Consumption throughout the year: How were “plates” converted into food weights? How was consumption of other fish preparations recorded (e.g. stews, soups, hashes?).

Page 18, 6.6.4.1 Presence of a monitor: Really like this idea

Page 18, 6.6.4.1 Use of digital voice recorders: Really like this idea.

Page 19, 6.6.4.4 Use of fish ID books: The use of species photos is important. In other survey work done, pre-survey work was done to associate common names with species. Be more specific about how common names were used in the interview approach.

Page 20, 6.8.2 Data analysis: References to a data table should be provided. Upper percentile (e.g. 90th, 95th) fish consumption rates are of importance for risk assessment and the data should be analyzed to present these percentiles. It would also be of interest to present consumption of resident species vs. salmon. Consumption should be categorized for individuals that were only consumers of particular species. Given variations in contaminant concentrations between shellfish and fish, it would be useful to provide consumption information for these groups.

Page 20, 6.8.3 Statistical tests: Curious as to why fish and non-fish consumers were combined. This has the potential to create a bimodal distribution which may obscure discerning distributional form. Though, this may not be an issue, as almost everyone consumes some fish. Additionally, since fish consumption rates are often considered to be log normally distributed, it may be appropriate to log transform the data before testing for normality.

Page 23, 7.2 Rates of Fish Consumption: Again, fish consumption rates are generally log normally distributed and normality testing of log transformed data may be appropriate.

Page 23, 7.2 Rates of Fish Consumption: What was the process for determining meal size?

Page 26, 7.2.3 Dietary recall: Might want to do a scatter plot correlating 24 hour recall and throughout the year consumption.

Page 27, 7.2.5 Consumption of different species by adults: Would be useful to evaluate consumption of broader groups of species, in particular consumption of salmon, resident species, marine fish, estuarine/freshwater fish, and shellfish.

Page 29, Figure 12: It is difficult to assign pie chart segments with the legend, similar colors make associations difficult. Suggest creating a table with fish species as row headings and villages as column headings with percent of species consumed in the table cells. This presentation would have the advantage of allowing quick comparison of species consumption across villages.

Page 30, 7.2.6. Consumption of specific parts by adults: Do these fractions necessarily need to add up to 100%? Provide more explanation as to how each category is defined.

Page 30, 7.3 Fish preparation methods: Are there any stews, soups, hashes or other preparations containing fish that are of importance?

Page 31, 7.5 Fish harvesting: Would be helpful to have a map of locations where fish are harvested.

Page 32, 7.7 Children: Were data collected on more than one child in the same household?

Page 34, 7.8 Adult consumption of non-fish subsistence foods: Would suggest integrating shellfish consumption with fin fish consumption information.

Page 37, 8.1.2 Low sample size and high variability: Use common statistic to compare variance between survey studies and the variance used for population size computations.

Page 38, 8.1.2 Low sample size and high variability: It would seem to me that the reliability of mean estimates would vary for villages with different population sizes given a constant sample size. Why not use a sample size for each village that reflects the size needed to establish a mean with particular precision and the population of that village?

Page 40, 8.2.1 Comparisons with the estimated national fish consumption rate for the US population: Identify the tribal FCR statistics used for comparison. If village 90th or 95th percentile consumption rates are used, the differential between these values and the FCRs used by ADEC and EPA will be even greater.

Page 41, 8.2.2.1 Adult rates of fish consumption: Would suggest that these comparisons would be better presented in a table to facilitate ease of review.

Page 41, 8.2.2.1 Adult rates of fish consumption, Port Graham: The statistic used for comparison should be specified (e.g. average, upper percentile etc.). The method of computation of the statistic should also be accessible to reviewers. There are many choices available as to what data are appropriate to compute a consumption rate. It seems that averages are being compared. Other relevant statistics should also be compared (e.g. median, 90th percentile).

Page 41, 8.2.2.1 Adult rates of fish consumption, Columbia River Basin: The statistic used for comparison should be specified (e.g. average, upper percentile etc.). The method of computation of the statistic should also be accessible to reviewers. There are many choices available as to what data are appropriate to compute a consumption rate. Other relevant statistics should also be compared (e.g. median, 90th percentile).

Page 42, 8.2.2.2 Seasonal fish consumption: Would suggest a bar graph or a table for comparison of different groups. The table or chart might also include information on the greatest and lowest availability of migratory salmon.

Page 46, 8.3 Recommendations and future studies: 17.5 grams per day is not an average, but rather the 90th percentile of a sample of seafood consumers and non-consumers. Since the statistics of both 17.5 and 6.5 grams per day are based on samples that include non-fish consumers, it is likely that they greatly underestimate fish consumption by individuals that consume some fish. Comparison of the 90th percentile of village consumption with 17.5 grams per day likely will result in a far greater difference in consumption rates.

This report is of utility for both risk assessment/environmental regulation and risk communication. Generally gram per day rates are utilized for environmental regulation, while the public thinks more in terms of meals (10 ounce) or pounds of fish consumed. The report may wish to consider measurement units used for presentation based on the subject context and target audience.